Applicant : Brandon A. Bartling
Serial No. : 10/743,585
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Art Unit: 1745
Examiner: Gregg Cantelmo



## REMARKS

Claims 1, 19, 23 and 29 have been amended, claims 4, 7, 21, 25 and 30 have been cancelled. Claims 1-3, 5, 6, 8-20, 22-24, 26-29, 31 and 32 remain in the application. Reexamination of the application and reconsideration of claims 1-3, 5, 6, 8-20, 22-24, 26-29, 31 and 32 is respectfully requested.

Claims 1, 19, 23 and 29 have been amended to add a lower limit for loss stiffness of about 25,000 N/m. Support is found on page 6, lines 20-24 of the specification.

Claims 19, 23 and 29 have been amended to add an upper limit for burst pressure of 60 psi. Support is found on page 14, lines 16-18 of the specification and in Fig. 4.

Claims 1, 19, 23 and 29 have been amended by incorporating the features of claims 4, 21, 25 and 30, respectively, and original claims 4, 21, 25 and 30 have been cancelled.

Claims 1, 19 and 23 have been amended by adding the limitation that the cell comprises zero added mercury. Support is found in original claim 7, which has been cancelled.

The specification has been amended to correct the reference number for the adhesive from "126" to 136 to correspond to Figs. 1 and 2 and distinguish the adhesive from electrical insulator 126.

Revision of Fig. 2 is requested, as shown on the attached Replacement Sheet. Fig. 2 on the Replacement Sheet is identical to Fig. 2 on the corresponding originally filed drawing sheet, except that on the Replacement Sheet the surface 104 having an air entry port 108 is deformed outward so that it is curved, and the shape of the tab system 202 is curved to correspond to the shape of deformed surface 104. No new matter has been added to Fig. 2. Support for this change is found on page 8, lines 2-9 of the specification as originally filed.

In the Office action mailed October 3, 2006, the Examiner objected to the drawings and rejected claims 1-32. The drawings were objected to under 37 CFR § 1.83(a). Claims 1-32 were rejected under 35 USC § 112, first paragraph; claims 3, 20 and 24 were rejected under 35 USC § 112, second paragraph; claims 1-5, 9-20, 12, 14-17 and 19-26 were rejected under 35 USC § 102(b) as anticipated by Oltman (US 4,649,090); claims 18-27 and 28 were rejected under 35 USC § 102(b) as anticipated by or, in the alternative under 35 USC § 103(a) as obvious over,

Oltman; claims 6-8 were rejected under 35 USC § 103(a) as being unpatentable over Oltman in view of WO 01/91224; claim 11 was rejected under 35 USC § 103(a) as being unpatentable over Oltman in view of Woodruff (US 5,328,778) or Shrim (US 6,265,102); claims 29-31 were rejected under 35 USC § 103(a) as being unpatentable over Oltman in view of WO '224; and claim 32 was rejected under 35 USC § 103(a) as being unpatentable over Oltman in view of WO '224. The rejections and objections have been overcome by the above amendments to the claims, specification and drawings for the reasons given below.

The Examiner objected to the drawings under 37 CFR § 1.83(a) for failing to show every feature of the invention specified in the claims because the drawings do not show a curved external surface of the cell as recited in claims 3, 20 and 24. This objection has been obviated by a revision to Fig. 2 to show the external surface 104 of the cell on which the air entry port 108 is disposed as a curved surface.

The Examiner rejected claims 1-4 and 6-32 under 35 USC § 112, first paragraph, because the specification, while being enabling for a range of loss stiffness and burst pressure, does not reasonably provide enablement for all loss stiffness values less than about 55,000 N/m and does not reasonably provide enablement for all average burst pressures of at least about 43 psi. This rejection has been overcome by the above amendments to claims 1, 19, 23 and 29, in which a loss stiffness lower limit of 25,000 N/m has been added, and the above amendments to claims 19, 23 and 29, in which a burst pressure upper limit of 60 psi has been added.

The Examiner rejected claims 1-32 under 35 USC § 112, first paragraph, because the specification, while being enabling for the particular disclosed tab systems, does not reasonably provide enablement for all material combinations which may exhibit the same claimed properties. According to the Examiner, the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims; and it would require undue experimentation by one of ordinary skill in the art to determine which tab systems would constitute those systems which exhibit the same claimed characteristics. The Examiner also asserted that it is unclear as to whether or not all materials which do exhibit such characteristics would have been appreciated

by Applicant at the time the claimed invention was made and thus extends the claims beyond the scope to which the disclosed invention is entitled.

Applicant believes that the specification meets the requirements of 35 USC § 112, first paragraph. The specification discloses that the tab system comprises at least one polymer layer, an example of which is a tab system comprising two polymer layers (page 6). An example of a type of polymer that can be used for one or both polymer layers is a biaxially oriented polymer, such as biaxially oriented polypropylene (page 11), but each of the layers can be one of many polymers (page 6, lines 20-27). It has long been known that a wide variety of polymers are suitable for air cell tab systems, and examples are found in many of the prior art references of record. These include one or more layers comprising semi-permeable materials such as polyvinyl chloride, polythenes, and polystyrenes (US 2,751,428); polyester polyethylene, etc. (JP 63-224,161); coated polytetrafluoroethylene (JP 58-206,080); polyvinyl fluoride, nylon, polytriethylenechloride fluoride, vinyl chloride-vinylidene chloride cop9olymer, polyvinylidene fluoride, etc. (JP 58-186,173); polypropylene, polyester, fluorine resin and others (JP 58-164,173); and mylar and polyester (US 6,581,799). It is reasonable to expect that any suitable polymer or combination of polymers with the properties disclosed in the specification would be suitable for use in the invention. Undue experimentation would not be required on the part of the person skilled in the field of metal-air cell batteries to determine which tab systems would exhibit the claimed characteristics. The methods of determining those characteristics are disclosed in the specification, and the person skilled in the art of metal-air cells would turn to one skilled in the field of polymer science to obtain materials with the desired properties, with which the polymer scientist would be familiar, and many suppliers are skilled at selecting materials with the properties desired by the customer or modifying existing polymers to achieve the desired properties.

The Examiner rejected claims 3, 20 and 24 under 35 USC § 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention because it is not readily understood in light of the disclosure, since the claims suggest that the air entry ports are formed on the curved surface of the cell. Based on an interpretation that the curved surface as claimed is not the surface which includes the air entry ports, but rather the sidewall of the cell, it

is apparent from the drawings and disclosure that the air entry ports are not formed on the curved surface of the cell but rather on the lower planar surface of the cell. This rejection has been overcome with the above requested correction to Fig. 2 to show external surface 104 as a curved surface, thereby making it clear that the external surface in which the air entry port, covered by the tab system, is located.

The Examiner rejected claims 1-5, 9-10, 12, 14-17 and 19-26 as being anticipated by Oltman, since the prior art biaxially oriented polypropylene paper/acrylic adhesive combination appears to be substantially identical to at least some of the polymer layers exemplified in the present application, there is a reasonable expectation that the prior art paper of Oltman exhibits the same loss stiffness (claims 1, 5, 19, 22 and 23), peel strength (claims 2 and 21), oxygen permeability (claims 4, 21 and 25), and average burst pressure (claim 19). This rejection has been overcome by the above amendments to claims 1 and 19 by incorporating the features of claims 4 and 21, respectively, for the reasons given below. Independent claims 23 and 29 have been similarly amended by incorporating the features of claims 25 and 30, respectively. Independent claims 1, 19 and 23 have been amended to recite that the cell comprises zero added mercury, as recited in original claim 29.

Oltman describes a tab system (seal tab) having "a biaxially oriented three-ply synthetic paper of polypropylene to which a removeable acrylic adhesive is applied.... the exposed polypropylene paper surface is covered by a plastic film" (col. 3, lines 32-44).

As described in the Rule 132 declaration submitted herewith, Applicant has done testing of a tab system taken from Rayovac brand metal-air cell product (the assignee of the Oltman et al. reference). The results of this testing and calculations made based on that testing show that the tab system had a biaxially-oriented polypropylene paper layer, a plastic (polypropylene) film layer on the exposed surface and a removeable acrylic adhesive. The loss stiffness value was about 4,500 N/m at 20 °C to 25 °C, the peel strength was about 3.7-6.2 psi, and oxygen permeability value was about 5-8 ($cm^3$ x m x mm Hg) / ($m^2$ x day). Therefore, the tab system properties recited in claims 1, 19 and 23 are not inherent properties of the tab system disclosed by Oltman, since all three of these independent claims recite a loss stiffness from about 25,000 to 55,000 N/m at 20 °C to 25 °C and an oxygen permeability from about 50 to 150 ($cm^3$ x m x mm

Hg) / ($m^2$ x day). Claims 1, 19 and 23 have also been amended to recite that the metal-air cell comprises zero added mercury. Therefore, claims 1-3, 5, 9-10, 12, 14-17, 19, 20, 22-24 and 26 as amended above are not anticipated by Oltman.

All claims remaining in the application are also nonobvious over Oltman, considered either alone or in combination with any of WO '224, Woodruff or Shrim. None of these references disclose or suggest all of the features of a tab system according to the invention; none disclose both the loss stiffness and oxygen permeability recited in independent claims 1, 19, 23 and 29, and this combination of properties is not inherent in the materials disclosed in the references. In addition, there is no teaching or suggestion that would motivate one skilled in the art to use a tab system with the stiffness (loss stiffness from about 25,000 to 55,000 N/m at 20 °C to 25 °C) and oxygen permeability (50 to 150 ($cm^3$ x m x mm Hg) / ($m^2$ x day)) in the recited ranges to solve the problem solved by the present invention (provide improved adhesion of the tab system to the cell and allow hydrogen gas generated within the cell to escape at a sufficient rate to prevent the tab system from being dislodged from the cell), or that this is particularly important under the relatively high gassing conditions that exist in cells containing no added mercury. The Rule 132 declaration explains why Applicant believes that both of these features contribute to a more reliable tab system for metal-air cells, particularly for cells made without added mercury. Because the references relied on by the Examiner do not disclose all of the limitations of the present invention and do not teach or suggest any reasons for using a tab system with the claimed combination of properties, claims 1-3, 5, 6, 8-20, 22-24, 26-29, 31 and 32 are not obvious those references.

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For the above reasons, Applicants believe that the application is in condition for allowance. Withdrawal of the objection and rejections and allowance of claims 1-3, 5, 6, 8-20, 22-24, 26-29, 31 and 32 is requested.

Respectfully submitted,

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